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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/537,723	03/30/2000	Takashi Iwasa	P107348-09095	9078

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EXAMINER
HARPER, HOLLY R

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 09/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/537,723	Applicant(s) IWASA ET AL.	
	Examiner Holly R. Harper	Art Unit 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 6-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Sullivan et al. (USPN 5,821,680).

In regard to claim 6, the Sullivan reference discloses an electronic element that has at least two layers of amorphous carbon film (Abstract). This would include a main body and a surface layer. The film can include cesium (Column 1, Lines 52-60). Cesium is a metal element having a metal bond radius equal to or larger than two times the atom radius of carbon. The surface layer has an amorphous-tetrahedrally coordinated carbon material (Column 8, Lines 1-4).

In regard to claim 7, the Sullivan reference discloses an amorphous carbon film layer (Abstract). It is a property of the surface layer that the half-value width Hw of a photoelectron spectrum of C_{1S} is equal to or smaller than 2.0 eV.

In regard to claims 8 and 9, the Sullivan reference discloses that the amorphous carbon film layers have a plurality of periodicities, or projections (Column 5, Lines 19-22). The layer covering the periodicities will have to have protrusions to coat the projections. The films can contain Cesium (Column 1, Lines 52-60).

In regard to claims 10 and 11, the Sullivan reference discloses that Cesium can be added to the films (Column 1, Lines 52-60).

In regard to claims 12 and 13, the Sullivan reference discloses that the layers of amorphous carbon film are formed by depositing, preferably by a pulsed laser (Column 2, Lines 35-38).

In regard to claims 14 and 15, the Sullivan reference discloses that the electronic element is used as a field emitter for cold cathode field emission applications (abstract). Field emitters emit electrons with the application of an electric field to the cold cathode element (Column 4, Lines 2-4).

In regard to claim 16, the Sullivan reference discloses an electronic element that has at least two layers of amorphous carbon film (Abstract). This includes a main body and a surface layer. The surface layer has an amorphous-tetrahedrally coordinated carbon material (Column 8, Lines 1-4).

In regard to claim 17, the Sullivan reference discloses that the electronic element is used as a field emitter for cold cathode field emission applications (abstract). Field emitters emit electrons with the application of an electric field to the cold cathode element (Column 4, Lines 2-4).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cuomo et al. (USPN 5,852,303) in view of Geis et al. (USPN 5,463,271).

In regard to claim 1, the Cuomo reference discloses an electronic element with a deposited film containing cesium (Column 1, Lines 31-41). The cesium can be cesium oxide (Column 10, Lines 11-16). The Cuomo reference does not disclsoes emitter tips, but Geis, who is incorporated by reference, does teach the use of emitter tips (Figure 3). The small radius of the emitter tips concentrates the electric field and therefore has a large electron flow from the tip. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use emitter tips, as taught by Geis, to increase the flow of electrons.

In regard to claim 2, the Cuomo reference discloses an electronic element with a deposited film comprising amorphous film of carbon and tips of cesium (Column 1, Lines 31-41). The cesium can be cesium oxide (Column 10, Lines 11-16). The Cuomo reference does not disclose the height of the tips. However, it is noted that the emitter tips with a height between 10 and 500 nanometers is not shown to solve any problems or yield any unexpected results that are not within the scope of Cuomo's cold cathode emitter. It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify the height of the emitter tips to be between 10 and 500 nanometers.

In regard to claim 3, the Examiner notes that the claim limitation of the amorphous film of carbon formed by an ion beam deposition process using a negative ion beam is drawn to a process of manufacturing, which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over prior art by a process limitations.

Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

In regard to claims 4 and 5, the Cuomo reference discloses that the amorphous film of carbon is a cold cathode element (Abstract) that emits electrons under the influence of an electric field (Column 7, Line 56-Column 8, Line 17).

5. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sullivan et al. (USPN 5,821,680) in view of Cuomo et al. (USPN 5,852,303).

All of the claim limitations of claims 10 and 11 are met in the rejection by Sullivan above.

In regard to claims 18 and 19, the Sullivan reference discloses an electronic element that has at least two layers of amorphous carbon film (Abstract). The film can include cesium (Column 1, Lines 52-60). The Sullivan reference does not specify the amount of cesium in the amorphous carbon film, but the Cuomo reference teaches that the percentage of cesium should be between .01 and 25 percent of the carbon content (Column 10, Lines 18-22). If the amount of cesium is above 25%, the concentration is so high that the cesium atoms will bond with each other, creating a less stable matrix (Column 4, Lines 15-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a concentration of cesium in a range of .01 to 25 percent, as taught by Cuomo, to prevent the cesium atoms from bonding with each other and making the matrix less stable.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Pehrsson et al. (USPN 6,554,673 B2) discloses a cathode with an amorphous carbon film and cesium oxide tips and a filler of amorphous carbon.

Kim (USPN 5,908,699) discloses a cold cathode device with amorphous carbon film and cesium oxide tips.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Holly Harper whose telephone number is (703) 305-7908. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (703) 305-4794. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Holly Harper
Patent Examiner
Art Unit 2879

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